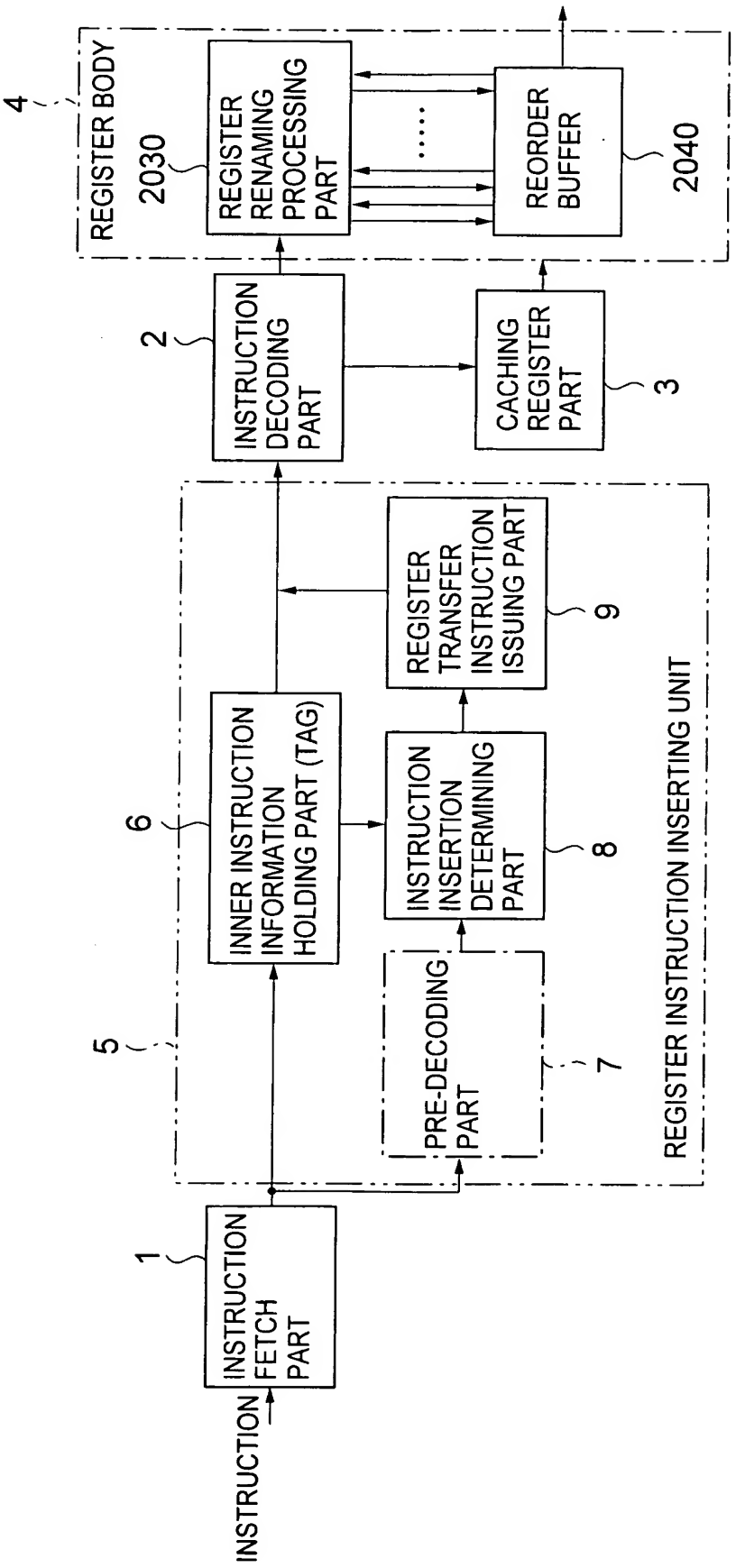
INSTRUCTION
INSTRUCTION FETCH PART
1
REGISTER INSTRUCTION INSERTING UNIT
5
INNER INSTRUCTION INFORMATION HOLDING PART (TAG)
6
PRE-DECODING PART
7
INSTRUCTION INSERTION DETERMINING PART
8
REGISTER TRANSFER INSTRUCTION ISSUING PART
9
INSTRUCTION DECODING PART
2
CACHING REGISTER PART
3
4
REGISTER BODY
2030
REGISTER RENAMING PROCESSING PART
.....
REORDER BUFFER
2040

FIG.1

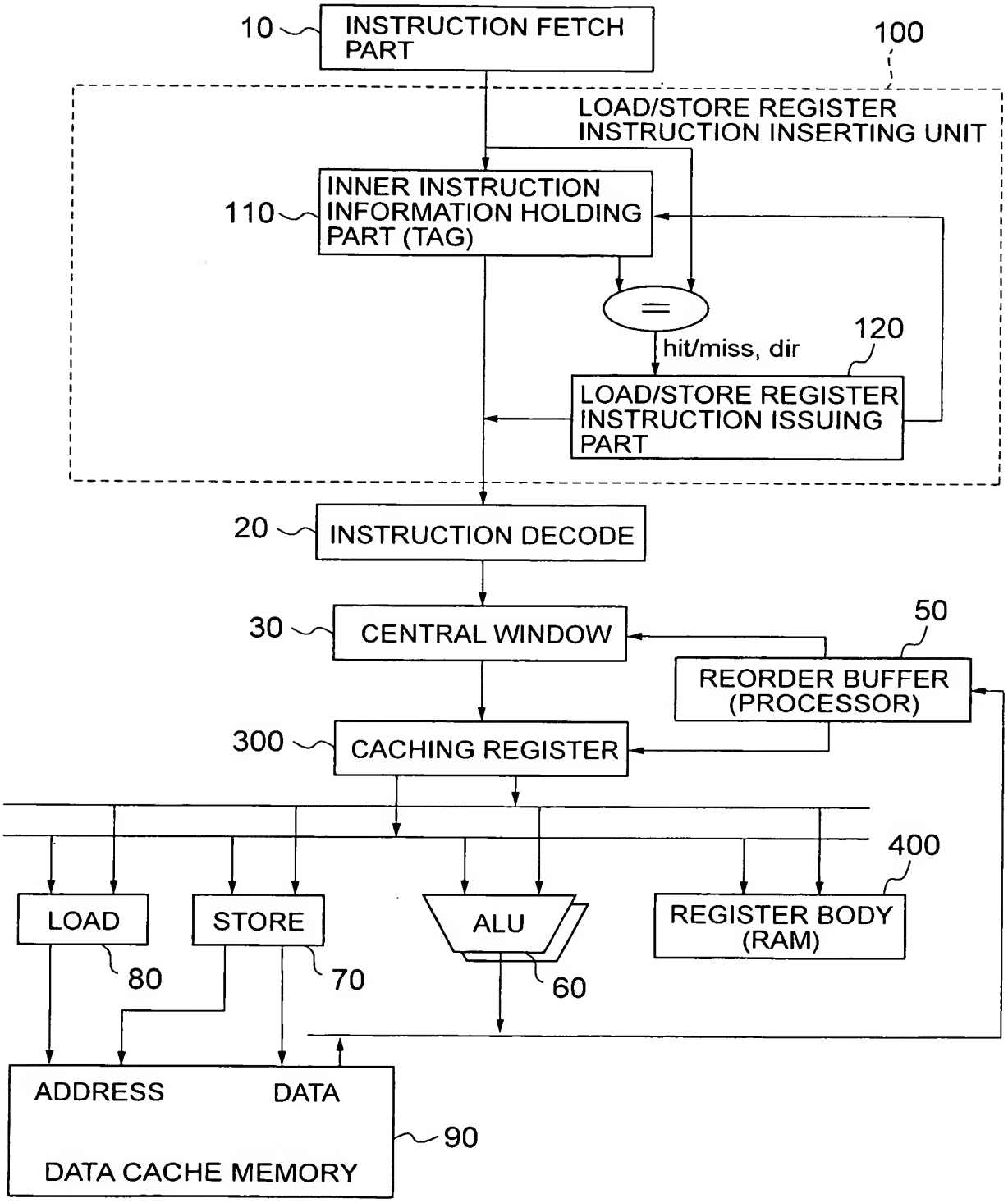
10
INSTRUCTION FETCH PART
100
LOAD/STORE REGISTER INSTRUCTION INSERTING UNIT
110
INNER INSTRUCTION INFORMATION HOLDING PART (TAG)
=
hit/miss, dir
120
LOAD/STORE REGISTER INSTRUCTION ISSUING PART
20
INSTRUCTION DECODE
30
CENTRAL WINDOW
50
REORDER BUFFER (PROCESSOR)
300
CACHING REGISTER
400
LOAD
STORE
ALU
REGISTER BODY (RAM)
80
70
60
ADDRESS
DATA
DATA CACHE MEMORY
90

FIG.2

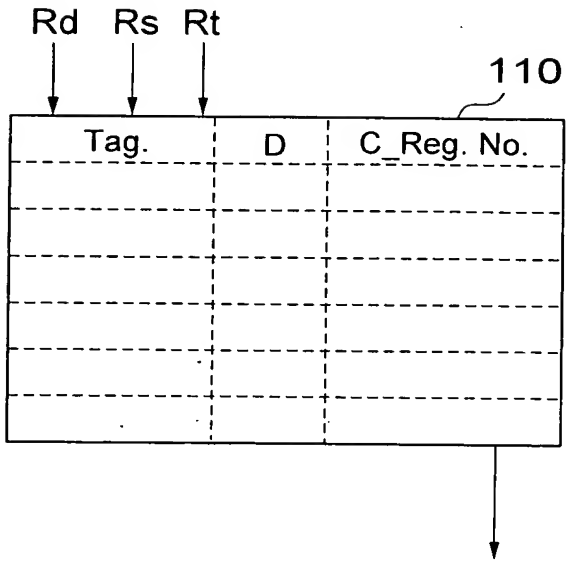

FIG.3

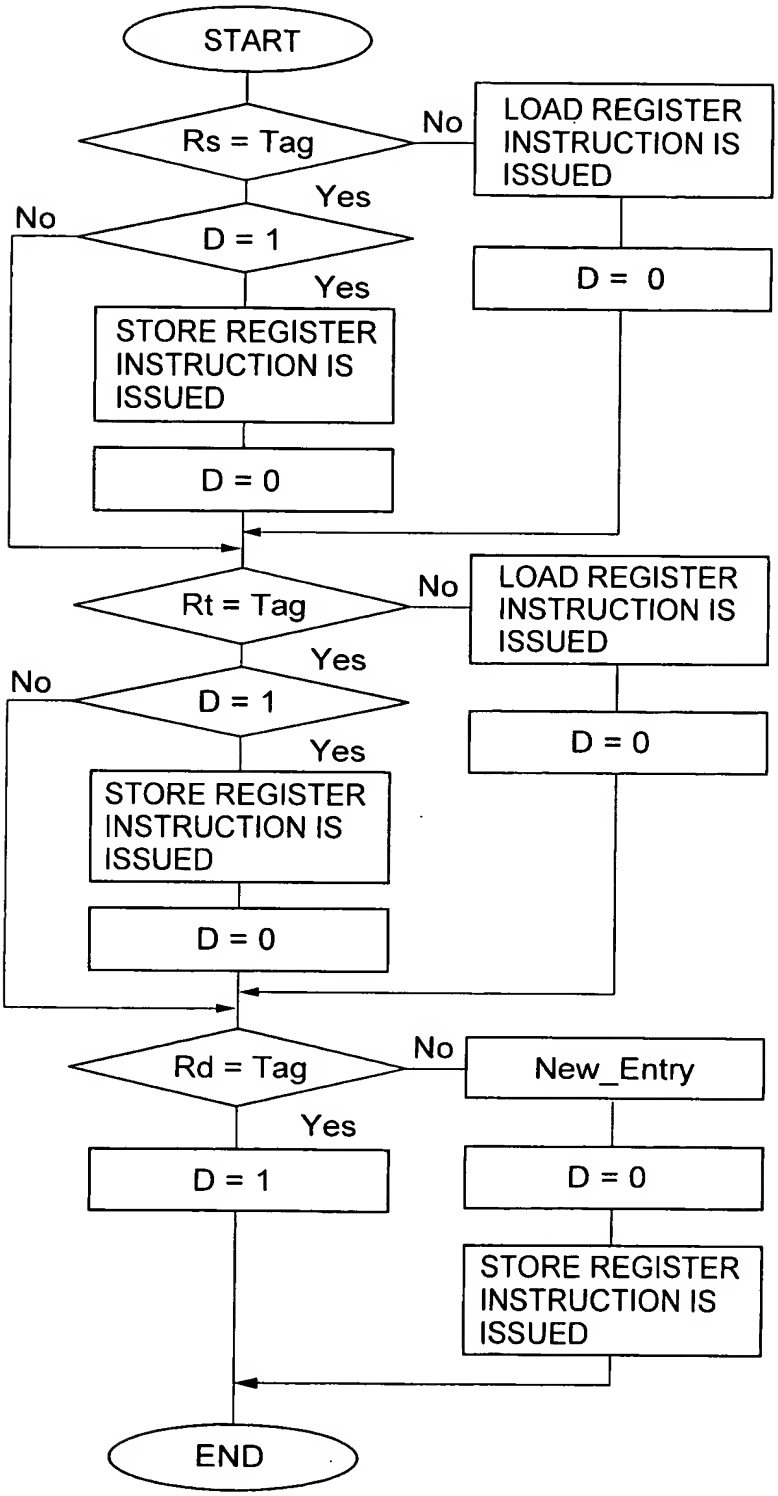
START
Rs = Tag
No
LOAD REGISTER INSTRUCTION IS ISSUED
Yes
No
D = 1
Yes
D = 0
STORE REGISTER INSTRUCTION IS ISSUED
D = 0
Rt = Tag
No
LOAD REGISTER INSTRUCTION IS ISSUED
Yes
No
D = 1
Yes
D = 0
STORE REGISTER INSTRUCTION IS ISSUED
D = 0
Rd = Tag
No
New_Entry
Yes
D = 1
D = 0
STORE REGISTER INSTRUCTION IS ISSUED
END

FIG.4

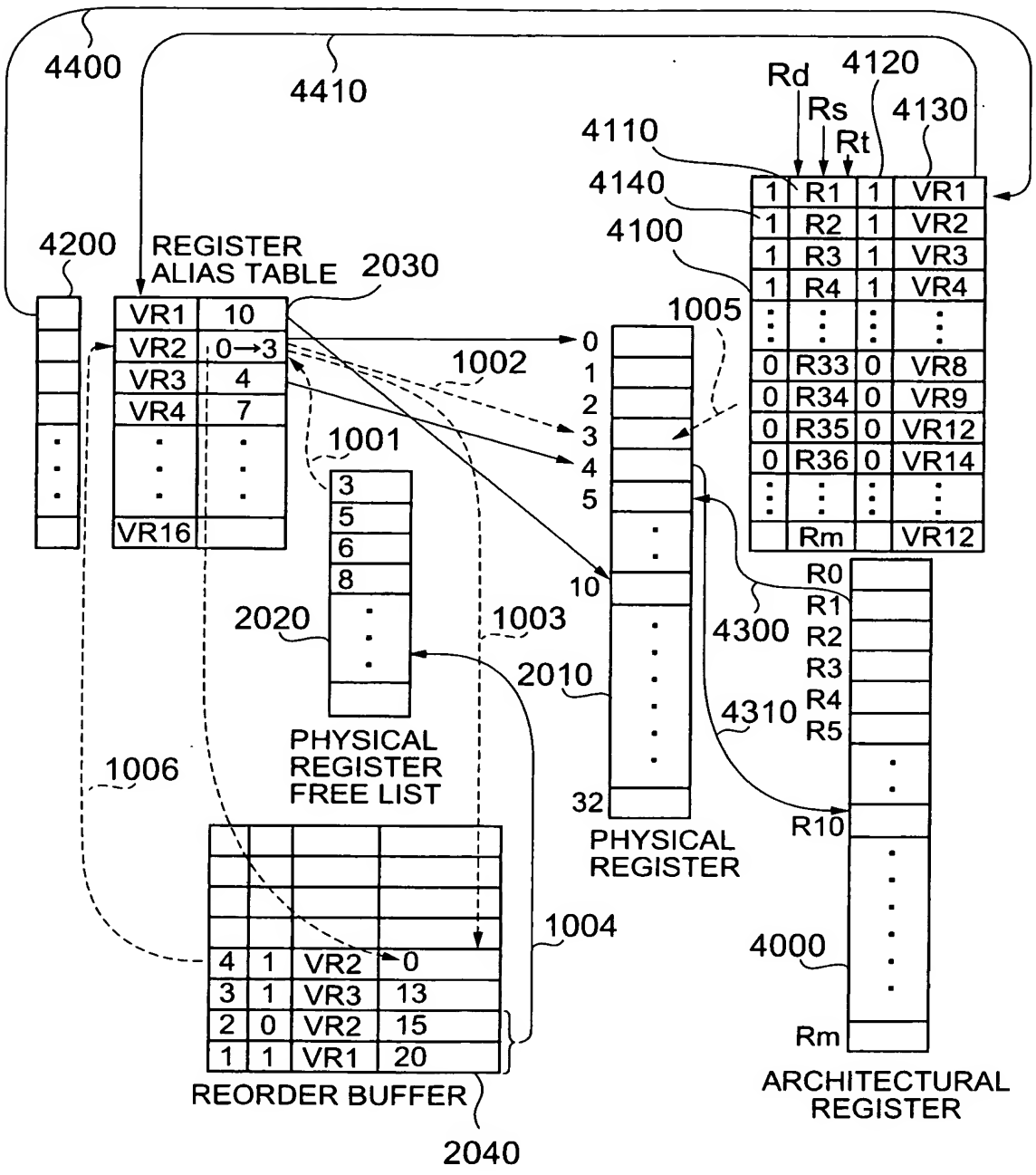
4400
4410
Rd
Rs
Rt
4120
4130
4110
4140
4100
4200
REGISTER ALIAS TABLE
2030
VR1 10
VR2 0→3
VR3 4
VR4 7
VR16
1 R1 1 VR1
1 R2 1 VR2
1 R3 1 VR3
1 R4 1 VR4
0 R33 0 VR8
0 R34 0 VR9
0 R35 0 VR12
0 R36 0 VR14
Rm VR12
1005
1002
1001
3
5
6
8
2020
1003
2010
4300
4310
PHYSICAL REGISTER FREE LIST
1006
PHYSICAL REGISTER
R0
R1
R2
R3
R4
R5
R10
Rm
4000
ARCHITECTURAL REGISTER
1004
4 1 VR2 0
3 1 VR3 13
2 0 VR2 15
1 1 VR1 20
REORDER BUFFER
2040

FIG.5

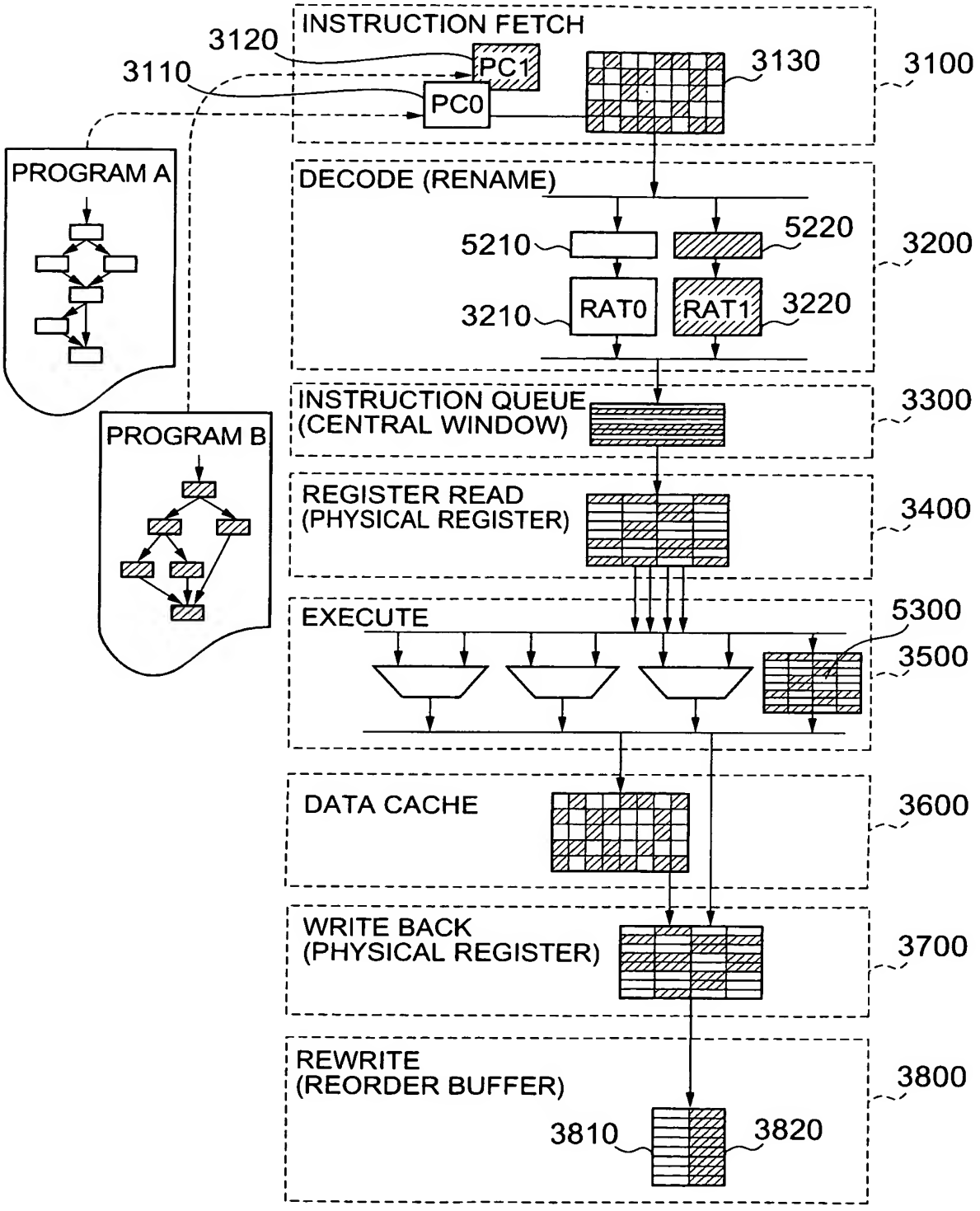
INSTRUCTION FETCH
3120
3110
PC1
PC0
3130
3100
PROGRAM A
DECODE (RENAME)
5210
5220
3200
3210
RAT0
RAT1
3220
INSTRUCTION QUEUE
(CENTRAL WINDOW)
3300
PROGRAM B
REGISTER READ
(PHYSICAL REGISTER)
3400
EXECUTE
5300
3500
DATA CACHE
3600
WRITE BACK
(PHYSICAL REGISTER)
3700
REWRITE
(REORDER BUFFER)
3800
3810
3820

FIG.6

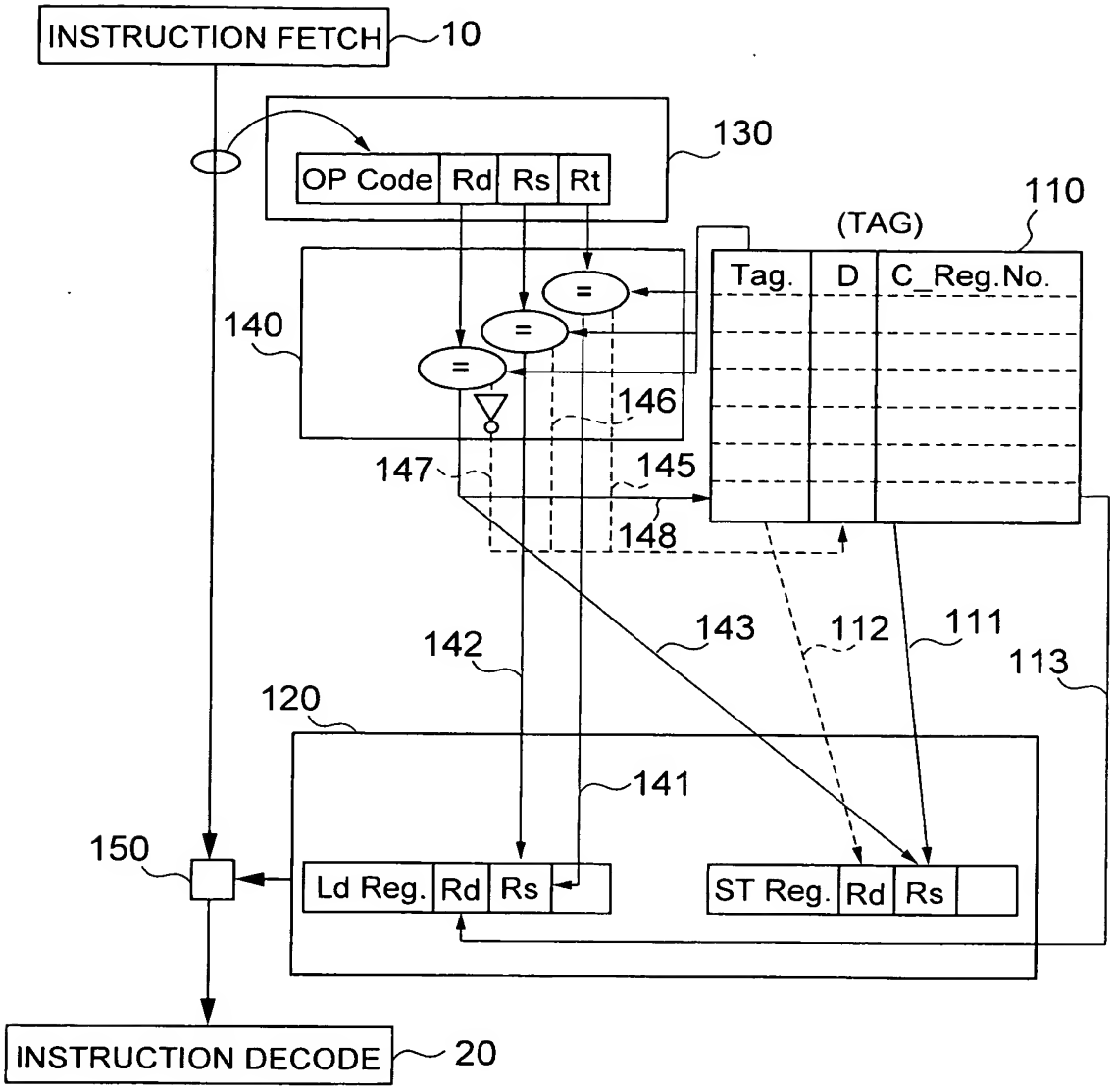
INSTRUCTION FETCH
10
130
OP Code
Rd
Rs
Rt
110
(TAG)
Tag.
D
C_Reg.No.
=
=
=
140
146
147
145
148
142
143
112
111
113
120
141
150
Ld Reg.
Rd
Rs
ST Reg.
Rd
Rs
INSTRUCTION DECODE
20

FIG.7

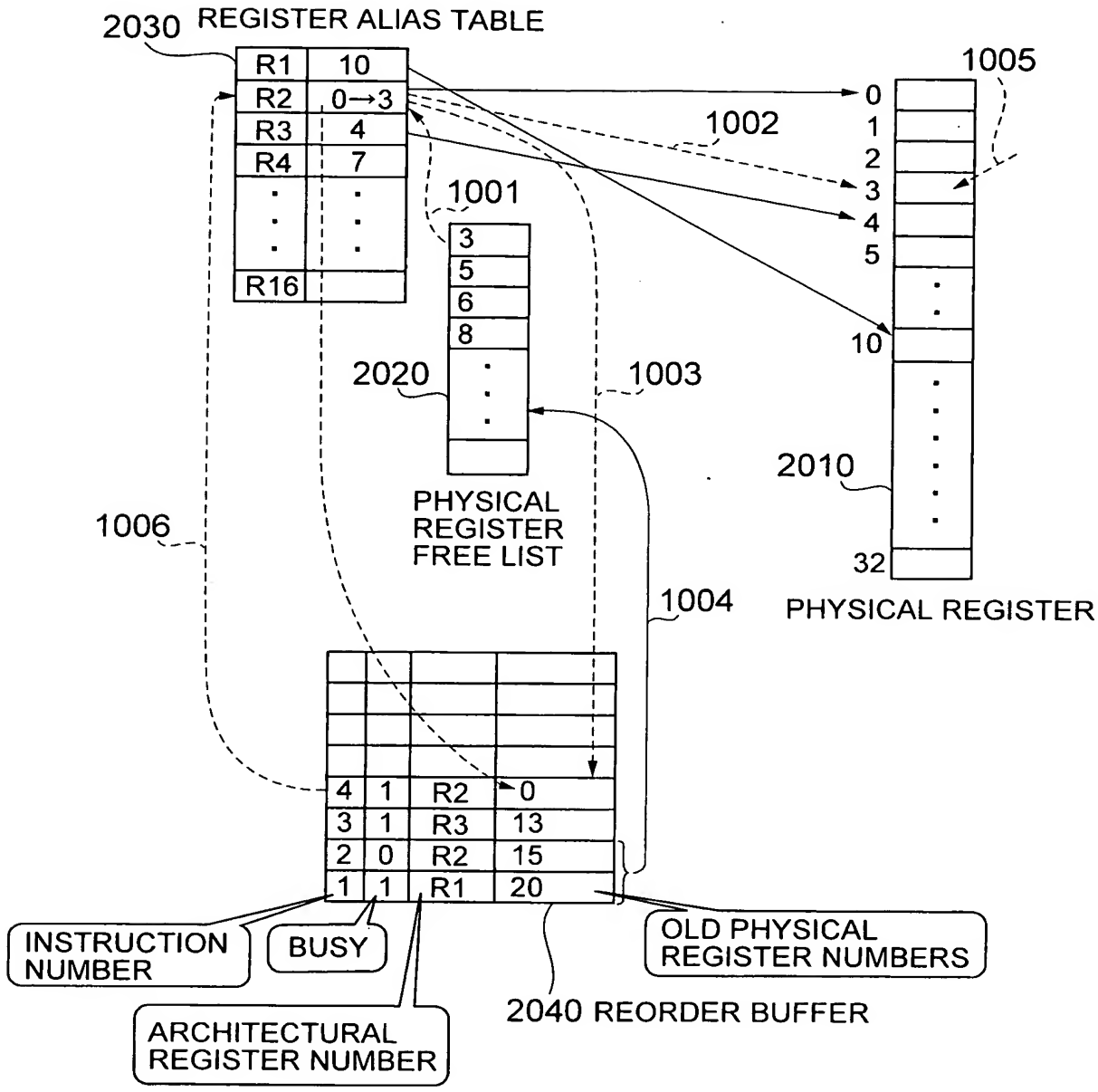
2030 REGISTER ALIAS TABLE
R1 10
R2 0→3
R3 4
R4 7
R16
1005
1002
1001
0
1
2
3
4
5
10
32
3
5
6
8
2020
1003
2010
PHYSICAL REGISTER FREE LIST
PHYSICAL REGISTER
1006
1004
4 1 R2 0
3 1 R3 13
2 0 R2 15
1 1 R1 20
INSTRUCTION NUMBER
BUSY
ARCHITECTURAL REGISTER NUMBER
OLD PHYSICAL REGISTER NUMBERS
2040 REORDER BUFFER

FIG.8

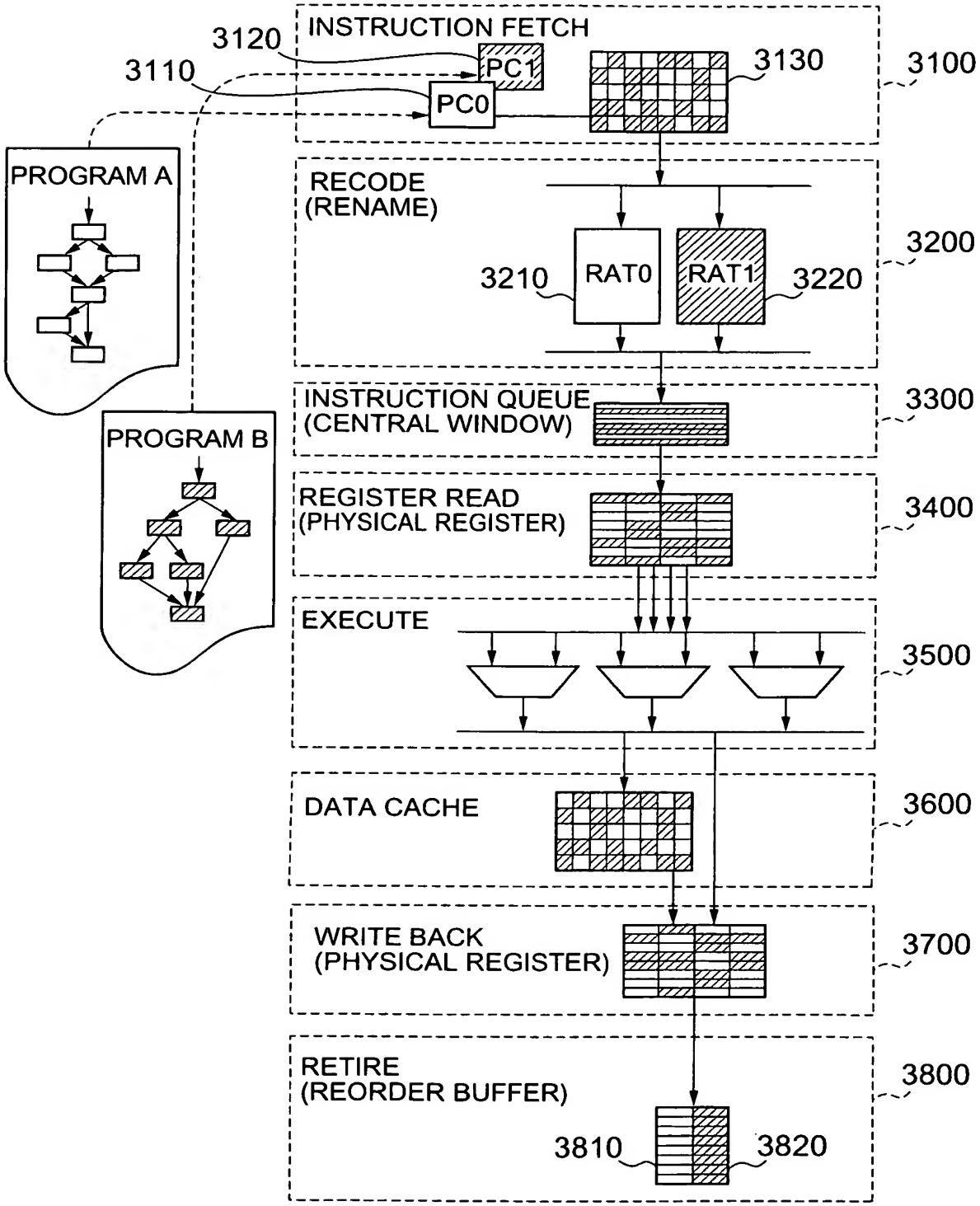
INSTRUCTION FETCH
3120
3110
PC1
PC0
3130
3100
PROGRAM A
RECODE
(RENAME)
3210
RAT0
RAT1
3220
3200
INSTRUCTION QUEUE
(CENTRAL WINDOW)
3300
PROGRAM B
REGISTER READ
(PHYSICAL REGISTER)
3400
EXECUTE
3500
DATA CACHE
3600
WRITE BACK
(PHYSICAL REGISTER)
3700
RETIRE
(REORDER BUFFER)
3800
3810
3820

FIG.9